

NASA Success Story

Lightning Detection and Ranging (LDAR) System



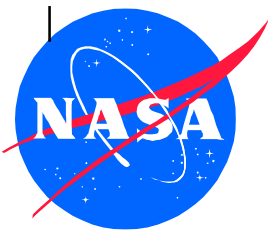
Global Atmospherics, Inc. of Tucson, Arizona has joined with NASA at Kennedy Space Center in a dual-use project to upgrade and commercialize the Lightning Detection and Ranging (LDAR) System. NASA's three-dimensional LDAR system can pinpoint the location and altitude of in-cloud and cloud-to-cloud lightning by measuring the exact arrival times of electromagnetic pulses. The system detects VHF radiation using a network of seven antennae deployed around KSC to map the extent of lightning. LDAR provides projections of the lightning in near real-time, varying from 1 second to 2 minutes. The data is used to define the existence and the volumetric extent of the lightning hazard, ultimately providing more accurate lightning warnings to KSC workers. Global Atmospherics (GAI) is the largest manufacturer and system integrator of lightning detection and location equipment and services in the world. They also own and operate the U.S. National Lightning Detection Network (tm). Products range from simple, single-sensor devices used to monitor local and regional lightning phenomena to fully deployed national networks that measure a full range of lightning parameters, providing data to a wide variety of users. GAI and KSC have signed a nonreimbursable Space Act Agreement to jointly develop an LDAR system meeting both NASA and commercial needs. GAI is contributing expertise and resources to this project to improve the current lightning mapping system and posturing LDAR for commercial use. The company is focusing on improving the location accuracy, small signal detection, and flexibility of LDAR using modular designs. GAI plans to develop, and offer for commercial sale, one or more lightning locating

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Lightning Detection and Ranging (LDAR) System (Continued)

systems based on the LDAR technology. For more company information, access the GAI Web page at www.glatmos.com.

NASA Involvement Under this Space Act Agreement, NASA is responsible for developing a Very Short Base Line (VSBL) prototype system that will be evaluated as an enhancement to the LDAR system. New LDAR display products will also be developed that improve the presentation of the collected data. The LDAR system was originally designed by NASA in order to help protect the Space Shuttle, workers, and equipment at Kennedy Space Center. NASA is responsible for handling, processing, launching, and recovery of the Shuttle and its associated payloads. KSC averages 75 thunderstorm days per year and lightning warnings are frequent, especially in summer. Work stoppages can impact launch schedules. In order to minimize unnecessary warnings, and thus maximize productivity without sacrificing safety, NASA developed its volumetric lightning mapping system.

Social/Economic Benefit NASA and GAI see many potential markets for lightning detection technologies. They include a broad array of industries, including the electric utility market, the aviation community, commercial rocket launches, recreation, construction, atmospheric research, and meteorology. NASA has benefited from LDAR's lightning mapping system. The 45th Weather Squadron at Cape Canaveral Air Station has been employing LDAR to accurately inform NASA of possible flashes. The U.S. Air Force and the National Weather Service (NWS) in Melbourne, Florida are the only organizations currently using the system as an operational tool. For instance, the NWS used LDAR to assist weather forecasters during the World Olympic soccer tournaments held in Orlando, Florida during the summer of 1996. NASA also supplies volumetric information to weather researchers worldwide. New Mexico Tech and other universities are using LDAR-type systems for research purposes on an occasional basis. Research is also underway into future space-based lightning detection and reporting of lightning flashes in real-time, and LDAR can be used to verify the correct operation of those systems by providing valuable "ground truth" information. This capability will give weather forecasters the ability to more readily evaluate threats due to lightning, thunderstorm intensity and growth, as well as storm dissipation throughout the United States.

Industry Partner

Global Atmospherics, Inc.

NASA Partner

Kennedy Space Center

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